

# Project Networks: Governance Choices and Paradoxical Tensions

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## ABSTRACT ■

This article examines how project networks may be viewed as either a single interorganizational project or as a series of projects that are interconnected by interorganizational relationships. The article then discusses some core theoretic assumptions about project networks as more than temporary systems in comparison with the extant empirical research. Next, the article presents four types of mechanisms for governing and coordinating not only projects but also project networks: responsibilities, routines, roles, and relationships. Finally, the article unearths five types of paradoxes (the distance paradox, the learning paradox, the identity paradox, the difference paradox, and the temporal paradox) impacting project networks and offers insights into the governance-based choices available for coping with these paradoxical tensions.

**KEYWORDS:** project; project-based organization; project network; governance; tensions; paradox.

## INTRODUCTION ■

**P**rojects matter for organizations, even whole industries or regions. Not only are many products and services developed, produced, and marketed with the help of this form of “temporary organization” (Lundin & Söderholm, 1995), but processes within or across organizations are generated or changed within projects. What is more, projects are central to quite a number of firms, in particular so-called “project-based organizations” (Hobday, 2000) and they are characteristic of those industries and/or regions in which “project business” (Arto & Wikström, 2005) dominates. Examples of project-based organizations include general contractors, television production firms, as well as advertising and event agencies; the industries and/or regions in which these organizations are embedded and operate are correctly conceived as “project ecologies” (Grabher, 2004).

Projects, however, are not only embedded in organizations, industries, and regions but also in networks of interorganizational relationships. If this is the case, the notions of “project coalitions” (Pryke, 2004) or “project alliances” (Abrahams & Cullen, 1998; Clegg, Pistis, Rura-Polley, & Marosszeky, 2002; Kwok & Hampson, 1996) have gained some prominence in the literature. This is, however, particularly true for the notion of “project networks,” although its meaning is often not quite clear. Even worse, at least two different, though legitimate, understandings can be distinguished: (1) a single interorganizational project (Hellgren & Stjernberg, 1995), and (2) a series of projects that are interconnected by interorganizational relationships (Sydow & Windeler, 1999) that enable and constrain the management of projects.

In what follows, both types of project networks as forms of temporary organizing will be explained in more detail and illustrated using empirical insights from a variety of industries. Then, we will explore how projects and, in particular, these two types of project networks are governed. We will highlight four R’s as mechanisms for governing and coordinating not only projects but also project networks: responsibilities, routines, roles, and relationships. We will conclude by unearthing the tensions and contradictions and even the paradoxes that management has to deal with when project management implies also managing interorganizational relations and networks.

### Project Networks as (More Than) Temporary Systems

Hellgren and Stjernberg (1995) define project networks in terms of three component characteristics: (1) a set of relations, where no single actor may act as a legitimate authority for the network as a whole; (2) a situation where the network is open in the sense that there are no definite criteria by which the boundary of the network may be identified and controlled; and (3) an environment where the network is temporally limited, dynamically changing, and (partially) reconstructed from one project to the next. These authors, not unlike Jones and Lichtenstein (2008), focus mainly on a single interorganizational project

as a temporary system—and the temporary network of relationships that supports project coordination.

This focus on single projects and internal relationships is perfectly legitimate, not least as a unit of analysis considered at one point in time. For that reason, researchers talk of “project governance” (Ahola, Russka, Artto, & Kujula, 2014; Müller, 2009) and highlight governance mechanisms at work on the level of single projects in order to ensure a predictable delivery of projects in time, quality, and cost. However, most projects are embedded either in organizations or in interorganizational networks so that they are surrounded by corporate governance or network governance, respectively, and in many cases even by both. The project business perspective takes this into account by focusing on “the part of business that relates directly or indirectly to projects, with a purpose to achieve objectives of a firm or several firms” (Artto & Wikström, 2005, p. 351).

Many projects have a predecessor as well as a successor of some kind (Davies, Dodgson, & Gann, 2016). More than a general sense that “history matters” (Engwall, 2003), this kind of temporal embeddedness is particularly obvious if projects are part of a series (Manning & Sydow, 2011), a lineage (Midler, 2013), or even an entire program (Artto, Martinsuo, Gemünden, & Murtoaro, 2009). In consequence, project networks more often than not are likely to be *more* than mere temporary systems. In this respect, they emulate project-based organizations (Hobday, 2000; Lundin et al., 2015). With regard to the three characteristics highlighted by Hellgren and Stjernberg (1995), empirical evidence seems somewhat to contradict this characteristic of strict temporariness.

***Characteristic 1: No single actor may act as a legitimate authority for the network as a whole.***

Project networks are complicated as authority structures because they are not only dynamic but polycentric; in other words, they have several centers

of authority and typically require the coordination of diverse sets of actors and relationships. Hence, it comes as no surprise that the governance of such networks may vary profoundly. As for any network, authority to coordinate may be organized in at least three forms (Provan & Kenis, 2008): (1) Network governance can be shared among the participating members, (2) a lead organization may govern the network, or (3) a network administrative organization (NAO) may govern the network (an NAO is a dedicated organization responsible for coordinating the network or at least supporting such processes). The effectiveness of each of these three governance modes hinges on particular boundary conditions that, according to Provan and Kenis (2008), include the level of trust, the number of participants, the degree of goal consensus, and to what extent there is a need for network-level competencies. To give just one example, shared network governance seems to require more goal consensus and trust and, thus, may be suitable only for networks of smaller size. All three forms of governance may also be used in project networks, including what Hellgren and Stjernberg (1995) exclude: a lead organization. This form, like the NAO, seems to be particularly appropriate, perhaps even indispensable, for larger and dynamic (project) networks in which shared governance, not least because of a lack of goal consensus and trust, may be difficult to establish.

There is abundant evidence of not only the lead organization mode in project networks (e.g. Manning & Sydow, 2011; Sydow & Windeler, 1999) but also of governance failures in coordinating project networks. For example, Van Marrewijk and his research colleagues (2016) observed the critical importance of agreements about responsibilities and roles made in the tender phase of an interorganizational project being clearly communicated to the project employees of both the contractor and client organization during the execution phase. Their research documents the disconnect that can occur between the more permanent

actors (principal contractor or client as lead organization and subcontractors) and how this disconnect can filter down to the operational interactions impacting the relationships between the (temporary) project (often team) entities created by each permanent principal in the project. These disconnects can become irreconcilable and result in project termination, as illustrated in Van Marrewijk and colleagues’ (2016) case study of the Panama Canal megaproject.

***Characteristic 2: There are no definite criteria by which the boundary of the network may be identified and controlled.***

The blurring of network boundaries in general and project network boundaries in particular is widely observed. One reason is that project membership may be less than definitive. What is more, membership is dynamic and may vary, as in sequential projects where a set of actors in rather stable constellations coordinates the production of a series of projects. Here, specific participants may vary from project to project while the project principals may be more permanent. This ambiguity of boundaries is well documented in a series of studies by Sydow and colleagues on German television production (Manning, 2008; Manning & Sydow, 2011; Sydow, 2009; Sydow & Windeler, 1999; Windeler & Sydow, 2001). Their research suggests that the single project as a temporary organization is, in this industry at least, embedded in a more durable network of relations between permanent organizations and institutions that work on multiple projects over time. The more this is the case, however, the clearer the boundaries of a project network, even over time. Even if one avoids hastily classifying some parts of these systems—preferably at the periphery of the network—as “market-organized projects” (Lorenzen & Frederiksen, 2005), certainly not all relationships should be tagged as having a collaborative, reciprocal quality—which is a defining characteristic of networks as a form of governance (Powell, 1990).

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### **Characteristic 3: Each project is temporally limited and dynamically changing and (partially) reconstructed from one project to the next.**

If anything, temporariness is *the* defining feature of projects or temporary organizations (Bakker, 2010; Lundin & Söderholm, 1995). At the same time, it has been observed that no project is an island (Burke & Morley, 2016; Engwall, 2003; Lundin et al., 2015). History matters and many single projects seem to be embedded in either project-based organizations or project networks, as outlined above. In addition, both such organizations and interorganizational networks are embedded within broader institutional fields (Windeler & Sydow, 2001) or project ecologies (Grabher, 2004). Finally, in the shadow of past project engagement and anticipation of future project opportunities, managing a focal project is very different from the idea of managing an isolated project as an outcome of temporary organizing. To capture these particularities, we can only underline the value of Hellgren and Sjöberg's (1995) third characteristic, that projects are "(partially) reconstructed from one project to the next (p. 381)."

A recent case study of Dutch filmmaking illustrated how a movie producer's specific sponsorship of sequential projects affects the permanent and temporary organization's connectedness and project outcomes. This research by Sterne and Svejnova (2016) suggests that the shadows of the past and future experienced in earlier projects in the sequel sequence indeed impacted the tensions, boundary work, and boundary roles created in subsequent sequel projects to address these tensions.

### **Project and Project Network Governance—Governing by Four R's**

Projects and project networks, depending among others on the above-differentiated governance modes, utilize a variety of mechanisms to coordinate their work. More generally, governance mechanisms are safeguards that organizations

put in place to regulate exchange, minimize exposure to opportunism, protect transaction-specific investments, and promote the continuance of relationships (Jap & Ganesan, 2000; Jones, Hesterly, & Borgatti, 1997). Olsen, Haugland, Karlsen, and Husøy (2005) described the use of contracts, relational norms, and administrative controls as governance mechanisms for handling complex procurements involving several actors. Their work highlighted the importance of the interplay among more than one governance mechanisms.

Such mechanisms, potentially at work also in project networks as (more than) temporary systems, may be usefully summarized under a "four R's" classification: responsibilities, routines, roles, and relations. In terms of governance, responsibilities represent more contract-based governance, whereas routines and roles reflect administrative controls, and relationships represent social modes of governance. Previously, the second through fourth R's of this classification had been conceptualized and applied to the examination

of project-based organizing in creative industries (DeFillippi, 2015) but deemed to be useful also in other project ecologies, including construction and science-based industries. Although we do not claim that these four R's cover all dimensions of project and project network governance, they are certainly the more important ones. What is more, these mechanisms interact and serve the purpose of governance to be practiced—governing (Pitsis, Sankaran, Gudergan, & Clegg, 2014).

Given the fact that many project networks, as laid out above, should be conceived as more than temporary systems, all four governance mechanisms are relevant on two levels: the focal project and the broader network in which this temporary form of organization is embedded (see Table 1), contributing to outcomes on both levels in terms of project and network efficiency and effectiveness. Interestingly, project governance is often discussed with relation to corporate governance (Joslin & Müller, 2016; Müller, 2009), neglecting the fact that projects may not only

Level of Analysis	Focal Project	Project Network
Network emphasis	Internal network of relationships	External network of relationships in which projects are embedded
Governance types	Project governance: (1) shared, (2) project manager, (3) PMO	Network governance: (1) shared, (2) lead organization, (3) NAO
Governance mechanisms	Dominantly designed and formal, but increasingly reflexive with regard to unintended consequences	Dominantly emergent and informal, despite increased reflexivity
- Responsibilities	Project responsibilities	Network responsibilities
- Routines	Project routines	Interorganizational routines
- Roles	Project roles, including project manager	Roles in the network, including lead organization
- Relations	Within project, relations are temporary	Across project relations more than temporary
Governance outcome	Project success, often measured in terms of efficiency and effectiveness (i.e., with regard to quality, time, and cost)	Project network success, to be measured in number of projects "successfully" completed, but also in terms of broader network effectiveness

**Table 1:** Project governance and project network governance.

be embedded in corporations, but also in other types of organizations (project-based or not) and even in interorganizational networks or fields.

On the level of the focal project, *responsibilities* refer to the requirements or deliverables expected of all project participants and their liability for failing to fulfill these responsibilities, which encompass the four T's of temporary systems associated with project-based organizing: to manage a specific sets of *tasks* that are *time*-limited, and typically performed by a semi-temporary collection or *team* of individuals with different expertise who collectively enable the sponsoring or host organization to *transition* from one state of performance and capability to a new state (Bakker, 2010; Lundin & Söderholm, 1995). More often than not, the responsibility for project outcome, in other words, predictable delivery of projects in time, quality, and cost, is allocated to a project manager, sometimes supported by a project management office (PMO), typically installed in organizations that run portfolios of projects in order to standardize project management and enhance across-project learning (Hobbs, Aubry, & Thullier, 2008; Narayanan & DeFillippi, 2012). Only in rare cases is this responsibility shared among project members.

Though for any single project Lundin and Söderholm's (1995) four T's result from more or less intentional decisions or design choices, the same four T's can be identified on the network level as well for clarifying responsibilities. However, despite increasing attempts that Sydow and colleagues have observed in the television industry to coordinate activities more reflexively also on this level (Manning & Sydow, 2011; Sydow & Windeler, 1999), the whole network of relationships is—not least because of its complexity and dynamics—more of an emergent nature (Mintzberg & McHugh, 1985). Nevertheless, contracts regulating responsibilities are likely to play a role on the network level as well. Think, for

instance, of the production of a series or a portfolio of projects to be managed with regard to cross-project relationships. From the music industry, typically clustered in major cities, it is well known that the “majors” use contracts to coordinate projects (Lorenzen & Frederiksen, 2005).

Though not focusing on projects, Huang, Cheng, and Tseng (2014) examined the influence of formal, contract-based controls and social controls (e.g., relationship-based governance) upon the buyer-supplier cooperative performance in supply chains. Empirical evidence obtained via a mail survey from 106 firms participating in the Taiwanese “Center Satellite Production System” indicates that (1) there is an inverted U-shaped relationship between formal control and cooperative performance; (2) social control has a consistent positive effect on cooperative performance; and (3) the joint use of formal control and social control could enhance cooperative performance in supply chains, but only in cases with moderate usage of formal control. Otherwise, social control becomes a supportive factor that repairs cooperative performance damage from overwhelmingly applied formal control. This finding also makes sense for projects and project networks; in other words, we would expect that contractual governance is more effective if used in moderation and complemented by more relationship-based modes of governance.

*Routines* are repetitive patterns of interdependent actions (Parmigiani & Howard-Grenville, 2011). In projects, routines are often supported by shared artifacts (including information systems) and typically reflect established cycles of project work activities and their monitoring. These routines define the expected work flow and the milestones for evaluating project progress. Routines serve as a complement to responsibilities insofar as many of the project management routines facilitate the monitoring of project progress in meeting performance requirements and the identifica-

tion of outliers that require more urgent and closer attention by personnel whose roles mandate their attention to particular areas of project performance and associated project activity. Like responsibilities, within-project routines can be distinguished from across-project routines situated in the project network. Again, we argue that the former may be more deliberate, and the latter of a more emergent nature. However, coordination of project networks—not unlike supply chains or networks—may require more managerial attention to interorganizational routines (Zollo, Reuer, & Singh, 2002) on the network level.

The importance of repeated collaborative experiences on this level of analysis upon choice of governance modes is borne out in several studies. Davies and Brady (2000) develop the concept of economies of repetition to show that project-based organizations can offer “repeatable solutions by recycling experience from one project for others in the same line of business” (Davies & Brady, 2000, p. 932). Crucial to the achievement of economies of repetition is the very development of routines, which may—as interorganizational routines—also be in effect in project networks. Once having undertaken a one-off project, the same participants are involved in successive ones of the same type in order to consolidate routines, which they adapt according to the contingencies of each project (D'Andrea, 2014). García-Canal, Valdés-Llaneza, and Sánchez-Lorda (2014) argue that when developing new collaborative projects with the same partner, firms tend to repeat the same contractual form used in previous projects to take advantage of the governance routines developed in the past. Support for their predictions is provided by an analysis of a sample of technology alliances carried out by European firms. We assume that the inclination toward repetition is not restricted to formal contracts but includes informal routines as well, in particular if project networks are composed of project participants from previous collaborative projects.

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Drawing primarily on the television industry, where the tendency to repeat past project collaborations is significant, Sydow (2009) argues that the repetitive patterns and practices surviving beyond single projects may become project *network* routines. These routines may even become industry practices when they are repeated in different project networks. One risk of such project network routines is that they may lead to path dependence or even “lock-in” where these systems find it difficult to depart from previously employed routines even when specific project circumstances might call for a more flexible modification of previous project network practices. The lock-in problem of project network routines has particular implications for the relationship between project network routines and innovation. We expect that project network routines are positively associated with performance on projects that have similar requirements to projects that previously utilized these project network partners. By contrast, we expect project network routines to be negatively associated with performance on projects that have unique requirements not previously experienced by project network participants. Finally, the usefulness of routines may also depend on the innovativeness of the task. For very innovative tasks, more flexible, informal coordination (informal roles and relationships) may be a better mechanism to support project progress than routines.

*Roles* refer to the various authority assignments for each party to a project contract, and these roles typically include hierarchical authority lines as well as expected lines of communications among project participants occupying specified project roles. Presumably there is an expectation that authority assignments are matched to responsibility assignments for each project participant. This expectation may even be valid for innovator roles that are not only particularly dynamic but characteristic of many project-based

organizations (Gemünden, Salomo, & Hölzle, 2007). Turner and Keegan (2001) suggest two specific interface roles, the broker and the steward, which should be of particular importance not only in projects but also in project networks. The broker is responsible for the relationship with the external project client, whereas the steward focuses on the relationship between the parent organization and the project team. These roles may be generically defined by project contracts, but the specific types of relationships enjoyed by various role participants are more likely to emerge during the course of the project, in other words, to result not simply from passive role-taking but also active role-making (Graen, 1976). In project networks, taking and making the broker role seems particularly important, to connect the project not only to the project client but also to other external project partners. In television production, the client, the producer, and the director—all of whom are involved in brokering of some kind—are very likely to form the stable core that coordinates project networks (Manning & Sydow, 2011).

Whitley (2006) distinguishes between those project-based organizations that expect project participants to utilize standardized, separate, and stable roles and skills versus those that require project participants to utilize changeable roles and skills. Stable and separate roles are most likely to be found in craft-dominated sectors (e.g., filmmaking and video games) where roles are skill based, craft standardized, and remain stable over a succession of projects for various project participants, who can move quickly from project to project and join new project teams with their roles predefined by their skill specialization and function (Bechky, 2006). By contrast, in some project-based organizations, such as those in the Munich enterprise software industry (Grabher, 2004; Ibert, 2004), workers adopt different roles over the course of projects and in different project teams, and the division of labor is not so strongly structured around

previously codified skills. Coordination of tasks and skills is more complex in these kinds of project-based organizations, but their greater organizational flexibility enables them to change work processes (routines) more readily. In consequence, we expect project networks to employ standardized, separate, and stable roles on projects that require stable and standardized requirements for each project network engagement. By contrast, project networks are likely to employ more idiosyncratic roles on projects that require unique requirements for each project network engagement.

*Relations* refer to specific qualities of the interactions among participants in project work. Powell (1990) argues that network forms of organizing are distinctive from both market (contractual) and hierarchical (administrative) forms of governing economic activity, as they are based on trust, reciprocity, and open-endedness. Further examination of network forms of organizing projects has emphasized the relational as well as the structural embeddedness of economic activity involving network participants (Jones et al., 1997; Jones & Lichtenstein, 2008). Relational embeddedness refers to how focal dyadic (interpersonal or interorganizational) relationships and their qualities, histories, and developmental processes affect economic behaviors and outcomes. The structural aspect of embeddedness emphasizes the relevance and impact of the larger ongoing network of relationships—its density or centrality, for instance—in which economic action occurs and develops and the dyads are themselves embedded. Capaldo (2014) concludes that simultaneous consideration of structural and relational embeddedness can enrich our understanding of network-based forms of organization and their impact on outcomes, specifically of interorganizational cooperation.

Qualities of relationships often include trust and reciprocity, as illustrated in Swärd's (2016) longitudinal case study of a three-year construction project. Jones and Lichtenstein (2008)

propose that trust evolves out of prior relations that reduce transactional uncertainty and increase the shared understanding needed for effective coordination. Ebers and Maurer (2016) have empirically tested and modeled how prior relationships by project partners and relationship-specific investments by these partners can overcome recent project collaboration disappointments and provide the trust for these partners to renew their collaborations on future projects. However, such project commitments are not absolute. The availability of alternative potential partners whose expertise better fits new collaborative project requirements can lead to such new partners joining collaborations.

Network analysis of the structural embeddedness among project network participants offers additional insights into the importance of these characteristics on project performance. For example, Sedita and Apa (2015) investigated how a contractor's network position affects his or her success in winning public procurement projects, measured as the average value of projects won. They examined the network positions of general contractors involved in public procurement projects in the Veneto, Italy region from 2008 to 2012. They employed three measures of network position: breadth, reach, and brokerage. Only network breadth was found to be crucial in determining the success of firms in public procurement practices. Such studies promise to enrich our understanding of how the structural positions of key individual actors within project networks can support their collaborative success.

Project networks, quite like single projects or project-based organizations, occur in a context that impacts the use and effectiveness of these governance mechanisms. In particular, the institutional or regulatory context may allow for some contract or work arrangements and not for others. Moreover, particular coordinative practices may be common

in some fields or ecologies but not in others (cf. Lundin et al., 2015). In both cases, context enables and constrains project network organizing. Moreover, the complexity of working in project networks means that contract-based project responsibilities may need to be revisited during the course of project work, more often than not relating to past experiences and/or future expectations. Previous research has indicated how project responsibilities in the contract may be contradicted by operational responsibilities assumed by the temporary project network organization as a result of the legacy of responsibilities assumed in previous project engagements (Van Marewijk et al., 2016).

The uncertainties of complex project work may induce unexpected project changes and a search for innovative solutions to these uncertainties, which may be exogenous and/or endogenous to the project network. As a result, project participants may be compelled to make real-time adaptations to their original expectations for project responsibilities, roles, routines, and relationships for working with one another. It is during these periods of crisis, uncertainty, and innovative challenge that the quality of the contractual relationships among project participants is tested and becomes—or fails to become—the relational governance mechanism for coping with these uncertainties (Macneil, 1974). In these situations, the “required” trust must be swift (Meyerson, Weick, & Kramer, 1996), but must also be nurtured during a complex project, or even a series of projects, by large and small actions that signal reciprocal commitment to the project and the basis for making larger trust-based actions that may not have been anticipated *ex ante* in the project contract (Swärd, 2016). Recent work has examined the multidimensionality of trust, and such conceptual development should contribute to more nuanced applications in examining trust-based governance of project network relations (Shazi, Gillespie, & Steen, 2015).

Sometimes project networks can anticipate the likelihood of needing new sources of expertise in a complex project by including representatives with diverse previous project experiences and expertise. This intentional injection of diversity and novelty into a project network comes with the risk that the new project partners may lack the past experience of working with its other partners who share common past project engagements. As a result, the challenge becomes one of integrating new project partners into a project network where other project network partners have past project experience that shapes their expectations for their respective project relationships. Such relationships, characterized by trust and reciprocity, must be earned, whereas project responsibilities, roles, and routines are more an artifact of industry- or region-wide project norms and historical practice.

## **Paradoxical Tensions in Project Networks**

Project networks are subject to a variety of tensions whose resolution or even mitigation poses problematic dilemmas for the participating individuals or organizations (DeFillippi, Grabher, & Jones, 2007). These tensions are referred to as paradoxical insofar as they typically resist simple binary choices among alternatives for their management (Lewis, 2000). A recent review of the paradox literature describes paradoxes as persistent contradictions between interdependent elements (Schad, Lewis, Raisch, & Smith, 2016). Our discussion will examine a set of tensions and contradictions between interdependent elements in project networks and note the implications of these paradoxes for project network governance. In more detail, we will present the distance paradox, the learning paradox, the identity paradox, the difference paradox, and the temporal paradox. All five paradoxes—and others (cf. with regard to interorganizational relationships more generally, Sydow,

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Schüßler, & Müller-Seitz, 2016)—have to be managed, not only within single projects but also on the level of the whole project network. Although in some cases the network level will make managing paradoxes more difficult, in others it may remove some of the tensions involved.

### ***The distance paradox: Tensions exists between the temporary and permanent organization.***

The “attachment-detachment dilemma” (Sahlin-Andersson & Söderholm, 2002, p. 19) or “distance paradox” (Cohendet & Simon, 2007, p. 598) represents an ongoing debate regarding the extent to which a project organization should be decoupled from, or embedded in, a wider organizational context. Lundin and Söderholm (1995) advocate the planned isolation of the project organization once the task is defined in order to minimize disturbances from the environment and subsequent obstacles to implementation. However, Bresnen, Goussevakaia, and Swan (2004) point out that by encouraging project autonomy, project sponsors increase the difficulty of subsequently integrating the resulting project organization’s activities within an overarching set of organizational processes.

A related dilemma or tension within project-based networks is between the autonomy requirements of project participants and their embeddedness within interorganizational settings that demand integration of project activities within interorganizational coordination efforts (Sydow, Lindqvist, & DeFillippi, 2004). Alliance or coalition participants seek to maintain some control over project performance by their partners. However, effective collaboration requires some degree of organizational autonomy so that different project partners can contribute their specialized expertise without undue constraints.

Grabher (2002a, 2002b) identifies networks of governance and control as defining features of project-based organizing within the advertising and

new media industries, respectively. By allowing for local autonomy within specific core project teams, the overall project organization can provide a more flexible organizing context for project work. However, there are challenges involved in getting different project stakeholders to agree about how they can align their contributions within some coherent (inter-) organizational context.

Our conjectures suggest the following: These tensions between the temporary and permanent organizations are likely to be intensified in project networks where the responsibilities, routines, roles, and relationships among interorganizational project teams depart from the constituent responsibilities, routines, roles, and relationships that exist between the participating project organizations and project stakeholders or sponsors. Hence, modes of collaboration during the interorganizational project may depart from modes of collaboration that more typically define relations between the durable (permanent) organizations participating in the project network. Such risks seem heightened when unique project requirements and the participation of project managers and project staff with divergent project experiences and modes of collaboration come together.

### ***The learning paradox: Tensions exist between knowledge creation and transfer.***

A frequent paradox in the study of project learning refers to the following dilemma: On the one hand, through their transience and interdisciplinary nature, project ventures are likely to be very suitable for *creating* knowledge in the context of its application (Gann & Salter, 2000; Grabher, 2004; Hobday, 2000; Scarbrough et al., 2004). On the other hand, however, the temporary nature of projects seems to inhibit the circulation of knowledge. When the project dissolves and participants move on, the created knowledge is likely to disperse (Cacciatori,

2008; Grabher, 2004; Ibert, 2004). This dilemma between the ease of knowledge creation and the difficulty of knowledge transfer is commonly referred to as the learning paradox.

In their study of the learning paradox in knowledge transfers between interorganizational project ventures and their parent organizations, Bakker, Cambré, Korlaar, and Raab (2011) identified three relational governance factors (relational embeddedness, cognitive embeddedness, and temporal embeddedness) that contribute to knowledge transfer from the interorganizational project venture to the parent organizations of the project network:

- *Relational embeddedness* refers to the strength of the tie between two or more organizational actors (Uzzi & Lancaster, 2003). In interorganizational collaborations, such as project networks, the relational embeddedness of the tie between the project and the parent organization(s) is commonly manifested in the frequency of interaction between the project and parent, and the level of resource commitment (Rowley, Behrens, & Krackhardt, 2000). Another important indicator of the relational embeddedness of the relation between the project venture and the partnering organizations concerns the level of trust (Moran, 2005), both between the project venture and its parents and among the parents themselves. Higher relational embeddedness fosters knowledge transfer.
- *Cognitive embeddedness* refers to the extent to which the relation between the parent organization and the project venture is characterized by “shared representations, interpretations, and systems of meaning” (Van Wijk, Jansen, & Lyles, 2008, p. 835). In interorganizational collaborations, the degree of overlap between the knowledge bases of partner organizations is critical: Too low an overlap and partners cannot work together; too high an overlap and there is little for the partners to learn from one another.

- *Temporal embeddedness* refers to whether the parent organizations have worked with one another on previous project ventures in the past, and whether they expect—as is typical of project networks—to do so again (Bakker, Cambré, & Provan, 2009; Brady & Davies, 2004). Other things being equal, one would expect higher levels of temporal embeddedness of the project venture relationship to be associated with higher levels of knowledge transfer.

These three relational governance factors or forms of embeddedness are not exhaustive. Additionally, but somewhat cross-cutting, issues of resource control, power, and domination need to be mentioned. Together with the others, they contribute to the learning paradox and how it may be managed.

***The identity paradox: Tensions exist between individual and collective identity.***

A challenge facing all project networks is that of creating a collective identity for project participants while respecting the individual identities that participating individuals bring to the enterprise. A further complication of project networks is that project participants bring a third identity—namely, their organizational membership. These organizational identities and associated loyalties can create tensions with the requirements for working on a project with participants from other organizations with seemingly conflicting cultural norms and work expectations. A variety of governance mechanisms has been employed to address the tensions of individual and collective identity.

Role assignments are an organizational and industry mechanism for managing the identity paradox. Project participants in project networks bring with them a set of role-based identities that can be transferred from project to project (Bechky, 2006). These role-related identities are based upon participants' training, industry, or professional

certifications of competency, and their record of performance in previous project engagements.

As noted previously, some industries and project circumstances may require project team members to play different roles from project to project and sometimes within a single project. Grabher (2004) observed in the Munich software industry that software professionals in the course of their careers, and sometimes even in the course of a single project, switch roles, in part because of the lack of standardized role expectations for different categories of software workers, such as designers, coders, and testers. The practice of switching roles is also facilitated by the absence of explicit training certification for competency in software development. Collaboration within a software project team more typically evolves from an interaction between strict professional roles into relationships among acquainted colleagues. This finding suggests that relationships can sometimes replace roles as the primary governance mechanism for managing the tensions between individual and collective identity.

Another mechanism for reducing tensions between individual and collective identity is the creation of swift trust among project participants who have not previously worked together (Meyerson et al., 1996). Such trust may arise from team-building efforts necessitated by the high level of project work engagement among project participants, who subsequently form a team identity that complements rather than contradicts their individual role-based identities. This trust-building process thus reflects the utilization of relationship building as a governance mechanism for mitigating the tensions between individual and collective identity.

***The difference paradox: Tensions exist between crafting and standardizing practices.***

Project networks experience tensions between standard operating procedures

(routines) and customized crafted solutions to the challenges of unexpected or innovative project work tasks and challenges. Standardizing policies provide economies of repetition and repeatable solutions (Davies & Brady, 2000). However, these standardizing policies can become dysfunctional when a project or a series of projects contains unique (innovative) requirements.

Several options have been recognized for managing the difference paradox. One option is to create separate routines for managing the familiar versus more innovative elements of the project. Such a separation strategy assumes that the overall project is decomposable into such components and can have dissimilar operating routines for managing them. This simultaneous management of both standardized and customized operating routines has been characterized as an ambidextrous strategy (Tushman & O'Reilly, 1996). Indeed, a study of Heathrow's Terminal 5 project suggests that routines may be adapted ambidextrously in response to changing circumstances as a dynamic capability in complex projects, although Davies et al. (2016) point to the continuing fragility of such a capability. A second option is to create sequential project organizations. A vanguard project organization will create customized solutions for managing initially the most innovative elements of a project assignment. A second project organization will then transfer those lessons learned back into the mainstream project organization so that it can standardize these routines for coping with similar project assignments in the future (Brady & Davies, 2004). However, neither the separation nor the sequentialization strategy makes full use of the paradox theory and other dialectical approaches that prescribe accepting and managing rather than suppressing or circumventing the underlying tensions (Farjoun, 2010; Lewis, 2000). These paradox management approaches have received only limited attention in the project

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management literature (Lundin et al., 2015; Söderlund, 2011).

## *The temporal paradox: Tensions exist between past, present, and future project work.*

Project networks experience tensions between their past affiliations with project participants, their present requirements of these participants, and their future expectations of working with these participants. In more general terms, the present unfolds in the light of the past as well as the future. In fact, previous research has demonstrated that project network membership often is based on a consideration of past project history (the shadow of the past) when selecting project participants (Manning & Sydow, 2011; Schwab & Miner, 2008).

The degree to which a project relies not only on the shadow of the past but contains a credible shadow of the future (expectation of future project work with the same participants) can impact how a project network governs its interactions with project participants. Some evidence exists that the flexibility shown by a project network coordinator toward performance by its project partners is in part determined by positive experiences in previous interactions and expectations of possible future collaboration (Lighthart, Oerlemans, & Nooderhaven, 2016).

By contrast, projects where participants have no shadow of the past face the challenge of determining whether their current project participants are likely to be considered for future project engagements. Drawing on detailed, quantitative data on 102 construction projects in Germany, Ebers and Maurer (2016) find that a successful outcome of prior collaboration motivates project partners to continue their partnership, and that an increasing frequency of prior collaboration accentuates this positive effect. In addition, the authors identify two boundary conditions—namely, the degree of trust and relationship-specific investments—that affect how

experiences with the outcomes of prior collaboration influence expectations of future collaboration.

## Conclusions

Beyond the debate of whether project networks are a temporary or more than temporary organizational form, project networks are amorphous because they can be governed and coordinated in a variety of ways. Like other networks, project networks may be either governed by a lead organization, in a shared form, or with the help of a network administrative organization. In addition, responsibilities, routines, roles, and relations contribute to the coordination of project networks. Though in the focal project, these four R's—not least in the face of well-established project management techniques—are more an outcome of intentional design, on the level of the whole network they are more likely to be dominantly of an emergent nature. The more the four R's develop on this level behind the back of project managers, the more additional reflexivity may be needed with regard to the project network—for instance, in terms of sensing and seizing opportunities and reconfiguring capacities (Teece, 2007).

In sharp contrast to other types of interorganizational networks (cf. Sydow et al., 2016), project networks unsurprisingly dominate the business of projects. In consequence, project networks, not unlike project-based organizations, marry temporary activities with more permanent forms of organizing (Sahlin-Anderson & Söderholm, 2002). However, from this marriage tensions arise, some of which are of a paradoxical nature. In this article, we pointed to five such tensions that have to be managed: the distance paradox, the learning paradox, the identity paradox, the difference paradox, and the temporal paradox. Although future research should devote more attention to unearthing these paradoxes, project management should be more conscious about their indissolubility and acknowledge that they have

to be managed—or practiced—not only in projects but also in project networks.

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